

# CHAPTER-06



## Experiment: 06

**TO PERFORM AND REPORT IDENTIFICATION TESTS ON  
GIVEN SAMPLE OF SODIUM BICARBONATE AS PER I.P.**

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**Aim:**

To perform and report identification tests on given sample of sodium bicarbonate as per I.P.

**Requirements:**

**A. Glassware & Instruments:**

1. Volumetric flask
2. Pipette
3. Burette
4. conical flask
5. Glass rod
6. Analytical balance

**B. Chemicals & Reagents:**

1. Sodium bicarbonate
2.  $\text{H}_2\text{SO}_4$
3. Magnesium uranyl acetate solution
4. Distilled water (DW)
5. dil.  $\text{CH}_3\text{COOH}$
6. Dilute ammonia solution
7. Potassium antimonite solution
8. Potassium carbonate
9.  $\text{AgNO}_3$
10. Potassium dichromate

**Theory:**

Knowledge of acid/base chemistry, redox chemistry, and solubility are required for any process that can provide a qualitative determination of the ions present in a simple inorganic compound. In this regard, it is significantly easier to identify a single

pure compound than a mixture. This experiment focuses solely on identifying simple compounds, defined as those containing only one cation and one anion.

### **Monograph of NaHCO<sub>3</sub>:**

**Chemical formula:** NaHCO<sub>3</sub>

**Molecular weight:** 84.01

### **Organoleptic properties:**

- **Nature:** Crystalline powder or small, opaque, mono clinic crystals
- **Colour:** White
- **Odour:** Odourless

### **Physical Properties:**

- **Solubility:** Statements of solubility are denoted by a descriptive phrase and are intended to apply between 20 and 30 degrees Celsius. Sodium bicarbonate is freely soluble in water and practically insoluble in ethanol (95%).
- **Identification test:** This test is described to confirm that the examined item matches the label on the container. Failure to pass these tests indicates that the product may have been mislabeled or replaced.
- **Standards:** Sodium bicarbonate contains not less than 99.0 percent and not more than 101.0 percent of NaHCO<sub>3</sub>
- **Category:** Electrolyte replenisher; systemic alkaliser.

### **Procedure:**

#### **Physical Tests:**

- **Organoleptic properties:** Examine the compound for these descriptions. The chemical is crystalline powder or monoclinic crystals. The compound is white crystalline powder or small, opaque, mono clinic crystals.
- **Solubility:** Conduct solubility tests in the various solvents. The compound is freely soluble in water and practically insoluble in ethanol 95%.

<b>Identification Test of Sodium Ions</b>	<b>Identification Test of Bicarbonates Ions</b>
➤ Dissolve 0.1 g of the examined	➤ Boil the aqueous solution of the

<p>substance in 2 ml of water. When 2 ml of a 15 percent w/v <math>K_2CO_3</math> solution is added and heated to boiling, no precipitate is produced. Add 4 ml of freshly prepared potassium antimonate solution and bring to a boil. Allow the solution to cool in ice and, if necessary, scratch the inside of the test tube with a glass rod; a dense, white precipitate will form.</p> <ul style="list-style-type: none"> <li>➤ Add 0.5 ml of 1 M <math>CH_3COOH</math> to 2 ml of the test solution, followed by a large excess of magnesium uranyl acetate solution.</li> <li>➤ Add to the test tube 0.1 g of the examined substance suspended in 2 ml of water. Add 2 ml of <math>CH_3COOH</math> (2M), immediately close the tube using a stopper fitted with a glass tube bent at two right angles, heat gently, and collect the gas in 5 ml of <math>Ba(OH)_2</math> solution; a white precipitate forms and dissolves upon the addition of an excess of dilute HCl.</li> </ul>	<p>sample (<b>Note:</b> It release carbon dioxide).</p> <ul style="list-style-type: none"> <li>➤ To the aqueous solution of the sample add magnesium sulphate. (<b>Note:</b> No precipitate is formed when a solution of the substance being examined is treated with a solution of magnesium sulphate (distinction from carbonates). Boil until a white precipitate forms.)</li> </ul>
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**Observation:**

Test	Observation	Inference
<p><b>Physical Tests:</b></p> <ul style="list-style-type: none"> <li>i. Nature</li> <li>ii. Colour</li> <li>iii. Odour</li> <li>iv. Solubility                             <ul style="list-style-type: none"> <li>a. Water</li> <li>b. Ethanol 95%</li> </ul> </li> </ul>		

<p><b>Identification Test:</b></p> <p>i. Sodium Ions:</p> <ol style="list-style-type: none"> <li>1.</li> <li>2.</li> <li>3.</li> </ol> <p>ii. Bicarbonates Ions:</p> <ol style="list-style-type: none"> <li>1.</li> <li>2.</li> </ol>		
<p>*If observation is as specified in the procedure, write "passes the test"; otherwise, write "fails the test."</p>		

**Results:**

The given sample of sodium bicarbonate complies with the tests..... and does not comply with the tests..... For identification in accordance with the I.P.

**Viva Questions:**

- Detail the physical characteristics of sodium bicarbonate.
- Write any two tests for the identification of sodium bicarbonate.
- How will sodium bicarbonate be stored?
- Write classification for sodium bicarbonate.
- Provide the chemical formula and atomic mass of sodium bicarbonate.
- Mention the sodium bicarbonate standard given in I.P.
- Determine two pharmaceutical applications for sodium bicarbonate.
- Identify the cation and anion that result from the ionisation of sodium chloride.
- Provide definitions for opaque and monoclinic.